

REMARKS

The Office Action dated April 3, 2006, has been carefully reviewed and the following remarks are made in consequence thereof.

Claim 1 has been amended to more particularly describe Applicants' invention, specifically the monomer being mixed with a hematin catalyst in a solvent, and adding a peroxide initiator to the mixture to form an electrically conductive polymer.

Claim 2 has been amended to further describe the range of pH values of the solvent.

Claim 3 has been amended to depend on claim 1.

Claims 1-19 remain active in this application.

The examiner rejected claims 1-19 under 35 U.S.C. 103(a) as being unpatentable over Samuelson et al. (6,018,018) in view of Akkara et al. (hematin catalyzed polymerization of phenol compounds.)

Applicants teach mixing a monomer with a hematin catalyst in a solvent. There is no chemical reaction between the monomer and hematin before or after the polymerization of the monomer. Applicants use hematin with a monomer in a solvent to form a mixture. Then hydrogen peroxide is added to the mixture to begin the formation of a polymer.

Samuelson et al. teaches the polymerization of aromatic compounds in the presence of different templates using the enzyme Horseradish peroxidase (HRP). The pH

"Methods for Polymerization of Electronic and Photonic Polymers" NA-1219 CIP1 D1 (Column 3 line 57) for the reactions is in the range of pH 4-10. HRP is not active/stable

between pH 0.5 and 4. Consequently HRP cannot be used at very low pH to polymerize any monomers. The catalytic system taught by Applicants' claims 1-19 is based on derived hematin and is distinctly different from HRP in the ability to retain catalytic activity in low pH (0.5 to 4), and thus, Applicants teach increasing the range of pH for the aromatic polymerization.

Akkara et al. describes the polymerization of aromatic compounds in the presence of hematin. The pH of Akkara et al. for the reactions is in the range of pH 3.5-7.5. However, hematin is not soluble in pH lower than 6.0, and consequently not active between pH 0.5 and 4. The system of Applicants' claims 1-19, comprising a derived hematin (wherein the hematin catalyst has been derived with one or more non-proteinaceous amphipathic groups) is completely soluble and active at low pH, thus increasing the range of pH for the aromatic polymerization. Applicants assert that the derivation of hematin using poly(ethylene glycol) chains is a crucial step for the use of the catalyst at extreme low pH. In addition, Applicants' invention would not be obvious over Samuelson et al. in view of Akkara et al. because Applicants teach an electrically conductive polymer, whereas Akkara et al. do not, and Samuelson et al. cannot operate at low pH.

Thus, applicants respectfully aver that claims 1-19 would not be obvious to one skilled in the art over Samuelson et al. in view of Akkara et al.

In view of the foregoing remarks, it is believed that Claims 1-19 in this application are allowable and Notice to that effect is respectfully solicited.

"Methods for Polymerization of Electronic and Photonic Polymers" NA-1219 CIP1 D1
Should the examiner wish to contact Applicants' attorney regarding this

application, the Examiner is respectfully invited to do so by calling or writing the
undersigned in the Office of Counsel, U.S. Army Soldier Systems Center, Natick, MA
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Respectfully submitted,

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Date

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